

**A SIX-WAY WRIST AND FOREARM ATTACHMENT****DESCRIPTION****BACKGROUND OF THE INVENTION***Field of the Invention*

The present invention generally relates to a wrist and forearm attachment for use with, for example, a resistance machine or device that allows the user to exercise or rehabilitate their wrists, hands, forearms, elbows, rotator cuffs and shoulders in a manner that will stretch and strengthen those muscles. Preferably, the wrist and forearm attachment allows conditioning of the six primary functions of the wrist, elbow and forearm, and in one embodiment, allows conditioning of at least four of the six primary functions.

*Description of the Related Art*

Prior to this invention, people have used a variety of different pieces of equipment to exercise their wrists, hands, forearms, rotator cuff, and shoulders. These pieces include various free weights (e.g., bar bells) and resistance machines which are specific for example, for the forearms or shoulders. In many sports where hand/eye coordination is required (e.g., golf, tennis, baseball, softball, etc.) there is a desire to provide proper conditioning for the wrists, hands, forearms, elbows, rotator cuffs and shoulders. However, the athlete (professional or recreational) is required to understand and use a number of different pieces of equipment to achieve the desired conditioning. Often, the athlete will not understand or undertake all of the exercises needed for a good conditioning regimen, and will not utilize all of the equipment or perform all of the exercises which are needed. Furthermore, trainers and gyms which desire to provide a suitable workout regime for the wrists, hands, forearms, rotator cuff, and shoulders have the difficult task of assembling and providing a number of pieces of equipment, and providing education on their use. This strains both the monetary budget for the equipment, as well as requires a larger amount of floor space for the equipment in the gym, which is a distinct disadvantage in popular work out facilities or facilities which

are located within urban environments where space rental is costly.

### SUMMARY OF THE INVENTION

An exemplary object of the invention is to provide a wrist and forearm attachment that connects to a resistance machine (e.g., weight stack with pulley system; flexing bar system, etc.) or resistance device (e.g., elastic band or tubing, etc.) which is used to stretch and strength the muscles in a user's wrists, hands, forearms, elbows, rotator cuffs and shoulders, and, preferably, which permits conditioning exercises of the following six primary functions of the wrist, elbow and forearm: (1) wrist flexion; (2) wrist extension; (3) radial flexion; (4) ulnar flexion; (5) wrist/elbow supination; and (6) wrist/elbow pronation.

Another exemplary object of the invention is to provide a wrist and forearm attachment which allows for a user to grip the attachment with two hands to allow for sports specific training (e.g., a golf club, baseball bat, or tennis racket movement through a full range of motion), and/or to grip the attachment at different locations thereby allowing for different resistance amounts to be applied (i.e., increased or reduced resistance is experienced by the user depending on where he or she grips the attachment).

Still another exemplary object of the invention is to provide a wrist and forearm attachment which can be used for sports training and strengthening, rehabilitation of a user's elbows and forearms, or prevention of conditions such as tendonitis.

According to the invention, a wrist and forearm attachment for use with either a resistance machine, such as a weight stack and cable device, or resistance device, such as an elongated elastic strap securable to a base, preferably includes a handle with a first connector secured to one end, and a strap which is connected to or connectable to the handle which includes a second connector. The first and second connectors are securable to the resistance machine or device for allowing various conditioning or rehabilitation exercises to be performed. The handle preferably is long enough to accommodate a user's hand at different locations or to accommodate both hands of the user. The handle ideally is rotatable about its longitudinal axis to allow a free range of motion when exercises and conditioning is being performed. Preferably, the handle includes a guard on at least one end to protect the user's hand from being pinched by straps or cabling during stretching and conditioning. The guard is ideally at least twice the size in diameter as the diameter of the handle and can take a

5 variety of shapes including circular or polygonal. In a preferred embodiment, for sports specific applications, the handle is in the shape of a piece of sporting equipment such as a golf club, tennis racket, or baseball, softball or cricket bat. The wrist and forearm attachment may include several different straps of varying lengths or elasticities to allow for avoiding pinching of the user's hands during exercising or to allow different resistances to be applied.

10 In one embodiment, the wrist and forearm attachment includes a handle, at least six or eight or more inches in length, that spins freely with minimal resistance. The handle will have a cord (e.g., strap) that loops through a grommet and connects at two points separated along the length of the handle. In order to properly exercise the six primary functions of the wrist, elbow and forearm, the connection points will permit the handle to freely rotate along its longitudinal axis. In addition, the cord is attached to the handle in such a way that is easily  
15 removable and replaceable. The grommet allows the wrist and forearm attachment to connect to a pulley system or an adjustable pulley system such as, for example, a cable cross machine found in most fitness facilities and rehabilitation centers. The handle will also have a fixed eye loop that connects to at least one end and may also include a spinning eye loop.

20 Depending on the type of exercise performed by the user, the eye loop can be connected at either end of the handle or two eye loops can be connected at both ends of the handle, and these eye loops may be fixed, spinning or both. The fixed eye loop serves to fix the handle in place on the cord to prevent rotation along the handle's longitudinal axis. This is especially useful in preventing the cord from rubbing against the user when performing radial flexion, ulnar flexion, supination and pronation exercises. The spinning eye loop will allow the user  
25 to freely spin the wrist and forearm attachment without entangling the cord. The handle may include either a grooved finger positioning device or indicia about or along around its length and/or circumference that assists the user with different exercises. This handle design further allows the user to increase or decrease weight resistance by a simple repositioning of the user's grip on the handle.  
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The design of this invention will allow a user to stretch and strengthen their wrists, hands, forearms, elbows, rotator cuffs and shoulders via a single instrument, thereby enhancing physical efficiency, preventing injuries, and assisting in rehabilitation. This invention will be useful for those who require strong hands, wrists and forearms, such as  
35 golfers, fighters, tennis players, and baseball players. However, this invention will also be useful to those who require wrist, elbow, and shoulder rehabilitation, or as a means to prevent

adverse physical conditions such as tendonitis. Because of the compact nature of the invention, it can be placed in a bag for easy transport to fitness facilities, rehabilitation centers, etc., for attachment to a resistance machine. Alternatively, a fitness facility can keep a number of handles on sight in order to allow different users to use them with different resistance machines or resistance devices in the facility.

### BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of the preferred embodiments of the invention with reference to the drawings, in which:

Figure 1 is a side view of a first embodiment of the invention which includes a handle, guard and a first connector projecting from the handle;

Figure 2 is a side view of the wrist and forearm attachment of Figure 1 with a strap (cord) attached thereto with a second connector;

Figure 3 is a side view of a strap assembly showing grommets at either end for connecting to the handle, and a universal joint grommet in the middle;

Figure 4 is a side view of an embodiment of the invention where the strap passes through the handle along its lengthwise direction;

Figure 5 is a side view of the wrist and forearm attachment of the present invention with gripping devices located along the length of the handle;

Figure 6 is a side view of an embodiment of the invention where connectors are positioned at either end of the handle, and where the connectors may be selectively detachable therefrom;

Figures 7a-7c show different sports specific embodiments of the invention where the handle respectively takes the form of a bat, tennis racket or golf club handle;

Figures 8a-f show different exercises being performed with the handle;

Figures 9a-b show the handle being gripped by two hands and demonstrates the ability for the wrist and forearm attachment to provide a full range of motion; and

Figures 10a-b show the handle being gripped at different locations along its length.

### DETAILED DESCRIPTION OF THE PREFERRED

**EMBODIMENTS OF THE INVENTION**

Figure 1 shows a preferred embodiment of the wrist and forearm attachment 10 according to the present invention. It includes a handle 12, a guard 14, and a first connector 16 which projects from the handle 12. The handle 12 is to be gripped by a user during exercises, rehabilitation or conditioning, and preferably has a predetermined diameter that is sized to fit the user. For example, the diameter of the handle may be small for youths, medium sized for adults of average build, and large for adults of large build. In a preferred embodiment, the diameter is at least one to one and a half inches in diameter. A gym or other fitness facility which uses the wrist and forearm attachment 10 of the present invention may keep on hand several such attachments 10 of varying diameters to accommodate its patrons.

The handle 12 is preferably longer than those currently used in a number of resistance machine devices (i.e., those that employ a handle for lifting a stack of weights using a pulley system). For example, the handle 12 preferably is at least six or eight inches in length, and may advantageously be significantly longer (e.g., twelve or eighteen inches) in order to accommodate a user's hand at different locations along the length (see, e.g., Figures 10a-b) or to accommodate both hands of a user (see, Figures 9a-b). The handle 12 may include indicia or separate gripping regions 18 along its length.

The guard 14 may be formed of the same or different material than the handle 12, and can be integrated or integrally formed with the handle 12. Preferably, the guard 14 and handle 12 are made of metal; however, plastics and ceramic materials may also be employed. The guard 14, functions to keep a cable, cord, or strap from a resistance machine (e.g., weight stack and cable and pulley system) or resistance device (e.g., a rubber tube or elastic strap anchored to a machine or floor) from rubbing against or pinching the user's hand during his or her conditioning exercises. Preferably the cross-wise dimension or diameter y of the guard 14 is at least twice as wide as the diameter x of the handle 12. The guard 14 is preferably circular, but can take a number of different configurations, such as polygonal shapes. The different shapes may assist in performing certain exercises or in promoting storage or shipping (e.g., flat edges may assist in preventing the wrist and forearm attachment 10 from rolling around).

The first connector 16 is preferably an eye shaped device which can have the end of a cable or rubber tubing connected to it, thus allowing the wrist and forearm attachment to be

secured to either a resistance machine or device 10. However, the first connector 16 may take the form of hooks or other suitable configurations. Preferably, the first connector 16 is closely spaced to the guard 14 (e.g., preferably within 1-4 inches in many applications). The first connector 16 can be either fixed to the handle 12, connected to the handle 12 in a way which allows rotational movement of the handle 12 relative to lengthwise axis passing through the handle and stem of the first connector 16 as indicated by two headed arrow 20, or be selectively detachable from and attachable to the handle, or any combination thereof.

The wrist and forearm attachment 10 may also include a connection 22 on one end of the handle 12, thereby allowing a strap (not shown) to be connected to the handle 12 at connection 22 and the stem of the first connector 16. Although not shown in Figure 1, it should be understood that the guard 14 and first connector 16 can be connected at either end of the handle 12 or two guards 14 and two first connectors 16 can be positioned with one at each end of the handle 12. Furthermore, the guard 14 need not be positioned at the very end of the handle 12.

In some applications, the first connector 16 may be "fixed" and no relative rotational movement would exist between the handle 12 and first connector 16. However, as will be shown in Figures 8a-f, this "fixed" arrangement will allow at least four of the six exercises set forth to be performed in the best manner possible. In some applications, the first connector 16 and handle 12 may be freely rotatable relative to one another as indicated by arrow 20. This configuration allows all six exercises set forth in Figures 8a-f to be performed in an appropriate manner. The first connector 16 may also preferably be connectable in either a "fixed" or "rotatable" configuration. Furthermore, due to the rotatability along arrow 22 at first connector 16, it can be seen that wrist and forearm connector 10 contemplated herein is freely rotatable in any direction in any dimension in space.

Figure 2 shows a strap 24, which can be a cord, cable, tubing, rope, or other suitable strapping material connected to either end of the wrist and forearm attachment 10. Such as by using, for example, grommets that fit on connection 22 and the step of the first connector 16. Depending on the angle of the handle 12, the strap 24 contacts the guard 14 at point 26 and is prevented from rubbing against the user's hand. The strap 24 can either be permanently affixed, or selectively connectable to the wrist and forearm attachment 10.

A second connector 28 is positioned on said strap 24 and, similar to the first connector 16, permits connecting the wrist and forearm attachment 10 to a resistance machine or

resistance device, thereby allowing the user to exercise, rehabilitate, or prevent injuries to his hands, wrists, elbows, forearms, rotator cuff, and shoulders. In the configuration shown in Figure 2, the second connector 28 can slide along the strap 24 which passes through a central opening therein.

5 Figure 3 shows a different configuration where the second connector 28 is secured on a universal type connector 30, that allows the second connector 28 to rotate about an axis as shown by arrow 32. Grommets 34 on the ends of the strap 24 allow connecting to the strap to the wrist and forearm attachment (not shown).

10 In one embodiment, a user may have a wrist and forearm attachment 10 (as shown in Figure 1), and a number of different selectively attachable strap devices as shown in Figure 3. The straps 24 of different strap devices could be of different lengths so as to accommodate different sized hands of different users, and or to allow for different exercises to be more easily performed without the strap pinching the user's hand or interfering with an exercise. Similarly, the straps 24 of different strap devices could have a different elasticity so as to  
15 provide varying amounts of resistance (in addition to the resistance provided by the resistance machine or device (not shown) which is to be connected to second connector 28).

Figure 4 shows a configuration where a strap 24' extends through the handle 12 in the lengthwise direction such that a portion of the strap 24' extends out either end of the handle 12. In this arrangement, the strap 24' could be permanently affixed to the handle 12, or,  
20 alternatively, the ends of the strap 24' could be selectively securable to the universal type connector 30, thereby making the strap 24' selectively attachable to and detachable from the wrist and forearm attachment device 10. In some applications, the guard 14 (shown in dashed lines) or first connector 16, or both, could be included or not included as components of the wrist and forearm attachment device embodied in Figure 4.

25 Figure 5 shows external gripping portions or dividers 36 encircling the handle 12 which are positioned at different locations along its length. These gripping portions may allow the user to more easily grip the handle 12 at different locations (see, for example, Figures 10a-b). By gripping the handle 12 at different locations, the user will have a different amount of leverage, which can increase or decrease the amount of strength required to  
30 perform different exercises. A user might be better able to track his or her increase in strength by being able to track the locations of his or her hands relative to the gripping portions or dividers 36 (or indicia 18 as shown in Figure 1) when exercises are performed.

While the gripping portions or dividers 36 are shown as having a wider diameter than the handle 12, and having a substantially circular shape, it should be understood that these elements can take a variety of different forms, including without limitation for example, a simple knurling on the surface for increased grippability; separate gripping surfaces (e.g., leather or rubber (not shown)); and indented regions in the handle 12.

Figure 6 shows an embodiment of the wrist and forearm attachment 10 with first connectors 16 and 16' connected at either end of the handle 12. The stem 38 of the connector 16 or 16' may include a threaded or bayonet connection for securing it to the handle 12. Similarly, guards 14 and 14' might be included. Of course, it should be noted that the embodiment shown in Figure 6 also demonstrates that the end to which the guard 14 and connector 16 is connected can be changed to suit the needs of the user and the resistance machine or device to which the wrist and forearm attachment 10 is connected.

Figures 7a-7c show a variety of sports specific configurations for the handles that may be used in the wrist and forearm attachment. For example, Figure 7a shows the end of a baseball, softball or cricket bat 40 serving as the handle. The guard 14 and first connector 16 are preferably secured to the end of the bat 40. Similarly Figure 7b and Figure 7c respectively show the handle of a tennis racket 42 and the handle of a golf club 44 used as the handle of the wrist and forearm attachment of the present invention. As discussed above, these configurations can allow for two hands to contact the handle 40, 42, or 44. Because of the relative rotatability of the components as well as the relative rotatability at the first connector 16 (see arrows 20 and 22 in Figure 1), the user is able to swing the bat 40, racket 42, or club 44 in the natural way required for the sport. This allows for the "sports muscles" to be properly trained through a swing or stroke, for example.

Figures 8a-8f illustrate how the wrist and forearm attachment of the present invention may be used to exercise, strengthen or rehabilitate the six primary functions of the wrist, elbow and forearm.

In Figure 8a, the user performs a wrist flexion exercise. In this exercise, the user keeps his forearm 100 parallel to the floor (not shown) and starts with his fingers pointed downward (see left panel) gripping the handle 102 of a wrist and forearm attachment according to the invention. He finishes with his hand and fingers pointed upward with a closed fist. In this case, in the preferred embodiment, the handle is permitted to rotate about its longitudinal axis (see Figure 1 at arrow 20) (for finger roll shown in both panels of Figure



8a). Figure 8b illustrates a wrist extension exercise. Here, the forearm 100 is the reverse of that shown in Figure 8a, and the palm faces downward initially. Then, the user lifts the hand upward keeping the forearm 100 still (see right panel). These two movements (8a and 8b) allow for the increase in wrist flexibility and strength.

5           Figure 8c illustrates a radial flexion exercise where the forearm 100 parallel stays to the floor. The user begins with the hand fully stretched, then the user lifts the handle 102 upward (see right panel). Figure 8d illustrates an ulnar flexion exercise where the user's forearm 100 is perpendicular and upright where the handle is pointed towards the floor. Then, the user with minimal forearm movement extends the hand so the handle is pointing  
10           upward. The guard protects the arm from the cable touching during the movement. Figure 8e illustrates a supination exercise where the forearm is maintained parallel to the floor, and the handle 102 is rotated 180° from one side to the other. This provides resistance through the full range of motion. The forearm remains still during this exercise, and the guard avoids cable pinching. Figure 8f illustrates a pronation exercise which is essentially opposite to the  
15           supination exercise. Here the user grips the handle 102 and the user's palm starts out pointing downward, and, by rotation, ends up pointing upward (see right panel). Again, this provides resistance through the full range of motion. The exercises of Figure 8c to 8f can easily be performed with a wrist and forearm attachment 10 (as shown in Figure 1) where the first connector 16 is "fixed". These exercises can also be performed when there is relative  
20           movement of the handle 12 to the connector 16.

          Figures 9a and 9b illustrate the wrist and forearm attachment device 10 of this invention connected to a resistance machine at first connector 16 (see cable 200). The wrist and forearm attachment 10 is gripped by both hands of the user in a manner he might do for a baseball or golf swing. In Figure 9a, the wrist and forearm attachment device 10 is shown  
25           pointing generally upward, while in Figure 9b, the wrist and forearm attachment device is pointing to the side. This shows the invention provides for freedom of movement in the same manner required for a swing whereby the handle is rotatable in all three dimensions throughout the swing (see arrows 20 and 22 in Figure 1). In this way, the "sports muscles" are being trained and exercised in the same manner as occurs in an actual bat or golf swing or  
30           tennis stroke. That is, the hand, wrist and forearm muscles are exercised on different planes in an activity-specific fashion. This can be accomplished with one hand or two. This wrist guard beneficially keeps the resistance cord or cable off the user regardless of the plane of

motion.

Figures 10a and 10b show the wrist and forearm attachment device 10 of this invention connected to a resistance machine and being gripped at a relatively lower and higher location along the length of the handle. The change in gripping location changes the leverage for the user, thus making the exercise being performed more or less difficult. The user, and/or his or her physical trainer, may utilize this feature, which is attributable to the handle being greater than 6 or 8 inches in length (e.g., twelve or eighteen inches) to require more or less difficult exercises to be performed for exercise, injury avoidance, or rehabilitation purposes.

In the preferred embodiment, the resistance machine or device, whether it is a cable with weights or a cord or tubing, must be able to provide vertical, horizontal and or angular resistance (e.g., left to right, right to left, low to high, and high to low). For example, Figure 8a provides vertical resistance low to high, and Figure 8e shows horizontal resistance right to left.

While the invention has been described in terms of its preferred embodiments, those of skill in the art will recognize that the invention can be practiced with considerable variation within the scope of the appended claims.